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LOYOLA UNIVERSITY CHICAGO

AN EMPIRICAL STUDY OF COGNITIVE EVALUATIONS
USING HOUSE-TREE-PERSON DRAWINGS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

BY

ANNA M. HEIBERGER

CHICAGO, ILLINOIS

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CHAPTER I

REVIEW OF RELATED LITERATURE

Introduction

When a clinician needs to assess an individual's cognitive ability, which is often the case, standardized individual intelligence tests such as the Wechsler Adult Intelligence Scale-Revised are considered the method of choice. However, the administration of these tests is not always possible. Individual intelligence tests are expensive and time consuming to administer and many people are unwilling or unable to complete the tasks required of such tests. Also, intelligence tests are often criticized as being culture-biased. In these cases, cognitive systems involving drawings offer a quick, easy, non-verbal alternative. Often the administration of drawings adds no extra time to a battery of tests because they are already given as standard procedure as part of a personality assessment.

Historical Background

For at least a hundred years, people have looked to an individual's drawings as some sort of gauge of that person's cognitive abilities. Educators seem to have been the first

to observe the relationship between drawings and cognitive abilities by observing the development of children's drawings as they matured. Ebenezer Cooke (1885) proposed that children's drawings go through changes as a child develops intellectually. Ricci (1887) noted a similar sequence of developmental changes in drawings in his work with school children in Italy. Psychologists, then, followed educators, and began to study the development of children's drawings. Burt (1921) noted that children's drawings became less primitive as they became older.

Goodenough (1926) was the first to empirically show that children's drawings reflected intellectual abilities and development. Goodenough (1926) believed that the more developed a child was intellectually, the more realistic details he or she would include on a human figure drawing. A scoring system was developed to assess the human figure drawings of children and it was called the Goodenough Draw-A-Man test. It was proposed as a useful technique in the cognitive assessment of children, especially when financial and time constraints were an issue. Goodenough's (1926) scoring system was developed by collecting and examining the features of drawings from 100 children from kindergarten through fourth grade in order to determine which elements were typical for each grade level. In numerous studies, the scores on the Goodenough system have significantly correlated with scores on the Stanford-Binet Intelligence

Test and the Wechsler Intelligence Scale for Children (Harris, 1963). Clinicians began to use drawings as part of a standard test protocol after the development of the Goodenough's system with the Draw-A-Person test.

Goodenough and Harris (1963) revised Goodenough's (1926) scoring system and collected normative data. The normative group was quite extensive for this study of the Draw-A-Person. The sample included 300 children aged 3 to 15 from both rural and urban Minnesota and Wisconsin. The sample was representative of the general population in terms of socio-economic status.

Spontaneous drawings are not only useful in the cognitive assessment of children, but also appear to be useful in evaluating abilities in adults. Buck (1948) developed a scoring system to assess the cognitive level of adults. This was called the House-Tree-Person (H-T-P) technique. Buck (1948) devised this technique both as a projective device for personality assessment and as a quantitative measure of intellectual function. Much of the research in the area of House-Tree-Person drawings seems to focus on the drawings as a projective device that can elucidate personality dynamics and structure.

Developmental Trends

There have been many studies that deal with developmental trends using the House-Tree-Person drawings of children. Beck (1955) found that mentally retarded and

organically impaired children did not differ significantly in their drawings. He also suggested the need for the H-T-P scoring to be restandardized in order to use it with children's drawings. Markham (1954) had children, aged 5 to 9 years old, draw H-T-P drawings and had them complete paper and pencil tests of intelligence. Findings suggest that the drawings of 5 year olds differed from those of older children. In scoring the children's drawings for cognitive development, only three items showed significant positive correlations with mental age (Markham, 1954). Bieliauskas and Moens (1961) looked at the feasibility of using the H-T-P scoring system with children, by scoring the drawings of 63 children in the second through fifth grade. These children were also given the Kuhlmann-Anderson Intelligence Test. It was suggested that a revision of the H-T-P scoring was necessary if the quantitative approach was going to be used with children's drawings. Bieliauskas and Pennington (1954) studied the person component of the H-T-P drawings of 630 children ages 4 through 15 years in order to look at possible developmental trends. There were significant developmental trends found in aspects of composition, proportion, dimensions, and drawing details. Most of the significant changes involved the position of limbs, bilateral non-symmetry of the figure, connection of parts, three-dimensional representation, apparent animation, and interpart ratios. The development of the person drawing

seemed to be toward more complexity and conformity to the conventional look of the human figure (Bieliauskas & Pennington, 1954).

Bieliauskas (1980) mentions a study conducted by Repucci (cited in Bieliauskas, 1980), which suggests a system for scoring the house drawing of children ages 4 to 15 years. The system is based in part on Buck's (1948) scoring system and includes concepts related to the artistic evaluation of drawings. Many of the criteria were found to correlate highly with age. However the system was criticized by Bieliauskas (1980) as being too involved and requiring too much of a time investment. Duffy (1953) examined the tree drawings of 500 children from kindergarten through grade nine. Developmental trends of statistical significance were found. No sex differences were found in drawings of the tree. Overall, given the support of developmental trends in children's H-T-P drawings, it would seem useful to develop a different scoring system for children.

Fellows and Cerbus (1969) looked at sex differences in H-T-P drawings as indicators of developmental changes in sexual identification. On the H-T-P, boys drew a male first 77 percent of the time at 7 years old and it reached 100 percent at 12 and 13 years. On the other hand, girls drew females first 74 percent of the time at age 10 and 13, and up to 95 percent at ages 9 and 12. Heinrich and Triebe

(1972) also looked at this issue. Their study is a metanalysis on the topic of sexual identification in human figure drawings. Drawings from 4,443 girls and 4,989 boys were used. The children ranged in age from 5 to 18 years. It was found that 83 percent of boys drew male figures first while 78 percent of the girls drew female figures first.

Some researchers have examined the placement of drawings on the page and looked at this on a developmental continuum. Jolles and Beck (1953a) looked at the drawings of children from the ages of 5 to 12 years old. They found that in terms of horizontal placement, the psychological center of the page was to the left of the geometric center. Horizontal placement was found to vary with age. Jolles and Beck (1953b) also studied the vertical placement of drawings with children. Vertical placement also varied with age. The mean vertical placement was higher for boys than for girls. The authors speculated that this could signify a greater tendency for girls to seek satisfaction in fantasy than boys or a greater amount of striving among girls than boys.

While Goodenough, as well as other researchers, focused on the intellectual factors of children's drawings, she also saw the drawings as reflective of emotional maturity and of psychopathology (Taylor, 1977). Drawings have been a popular projective technique since the 1930's. Sundberg (1961) found that the Draw-A-Person was the second most

popular projective test among clinicians after the Rorschach Ink Blot test. Kahill (1982) also found, using a telephone survey, that the Draw-A-Person was very popular among clinical psychologists.

Issue of Artistic Ability

The popularity of use of drawings by clinicians to assess both personality and cognitive abilities has raised some controversy. Many clinicians have wondered about the role of artistic ability and/or training as a factor in performance on the drawing tests. Most research in this area has found some relationship between drawing ability and assessments of psychological adjustment (Kahill, 1984; Roback, 1968, Swenson, 1968). Feldman and Hunt (1958) investigated this issue by having 65 undergraduate students draw nude human figures. Three clinicians then rated twenty-five body parts on the drawings as indicative or non-indicative of psychological problems. Art teachers were then asked to rate how difficult it is to draw each of these twenty-five body parts on a five point scale. Feldman and Hunt (1958) found that those body parts that were rated as indicating the most frequent signs of psychological disturbance were the same as those considered the most difficult to draw.

Later research has also supported this with results indicating that artistic talent can at times be incorrectly interpreted as maladjustment (Cressan, 1975; Johnson &

Greenberg, 1978; Solar, Bruehl, & Kovacs, 1970). Feher, Vandecreek, and Teglas (1983) reviewed the literature on this topic and concluded that clinicians are influenced by artistic quality when evaluating person drawings. However, they still consider drawings as useful in personality assessment.

Little research has focused on artistic ability in relation to house and tree drawings. It would seem that these could be easier for some individuals to draw than a person, and including these in a protocol may help derive a more accurate assessment of an individual. Bieliauskas and Bristow (1959) found evidence that formal art training tends to increase the IQ scores on the House-Tree-Person drawings. This finding would seem to suggest that formal art training should be considered when computing the H-T-P IQs. In all, drawings appear to be valid tools in assessment as long as clinicians keep in mind that artistic talent can influence the drawings, and also that certain parts on drawings can be particularly difficult to draw. This could help prevent incorrect conclusions about poorly shaped parts as being indicative of pathology in cases where it is really indicative of limited artistic ability.

Another factor which may affect performance on the drawings is the presence or absence of learning disabilities. Cox and Howarth (1989) proposed that the Draw-A-Person may be useful in the study of learning

disabled children. They studied three groups, with 15 children in each group. One group was composed of normal four year olds, one group of normal nine year olds, and one group was learning disabled nine year olds. Cox and Howarth (1989) found statistically significant differences in the developmental quality of drawings between the normal nine year olds and the other two groups. The differences were not statistically significant between the learning disabled nine year olds and the four year olds. These results may mean that the drawings of the learning disabled children represent a developmental delay instead of a deficit in the skills needed in drawing. In all, Cox and Howarth (1989) see the Draw-A-Person technique as a useful method contributing to the understanding of learning disabilities.

Administration Issues

When one looks at research on drawings, the method of administration of these drawings is often overlooked. Manuals on the subject of drawings vary vastly in the instructions to be given to the subject. Machover (1949) tells people to "Draw a person. Draw the best person you can. Make your drawing a whole person and not a stick figure" (p.32). Buck (1966) gives instructions as follows, "I want you to draw me as good a picture of a house (or tree or person) as you can. You may draw any kind of house (tree, person) you wish, its entirely up to you. You may erase as much as you like, it will not be counted against

you. And you may take as long as you wish. Just draw me as good a house (tree, person) as you can" (p.18). Goodenough and Harris (1963) instruct children to draw an entire body and to draw a specific gender since they ran into difficulties with young children drawing faces only. Their instructions are as follow, "Draw a picture of a man. Make the very best picture you can. Be sure to make the whole man, not just his head and shoulders" (Goodenough & Harris, p.1).

Schofield (1978) found that African American children tended to draw Caucasian figures. Pfeffer (1984) found the same thing with children in Nigeria. However Pfeffer (1987) found that changes in the standard instructions changed the ethnic nature of children's drawings. When Nigerian children were told "draw yourself", they drew figures with darker skin (Pfeffer, 1987).

Buck (1948) stated the importance of using a special size of paper (7 X 8.5 inches) in order to get a scorable drawing. Other authors of projective drawing techniques also require a standard size of paper, most of them 8.5 X 11 inches (Burns & Kaufman, 1970; Koppitz, 1968; Machover, 1949). There is little empirical evidence that supports the idea of a specific size of paper being necessary to get a valid drawing, with the exception of one study. Yague and Argullo (1959) conducted a study that indicated that performance on the Goodenough Draw-A-Man Test was influenced

by paper size. However in an extensive review of the literature (Bieliauskas, 1980), there was no evidence supporting the idea of paper size as an important variable. Bieliauskas and Farragher (1983) conducted a study in which they administered the H-T-P test using four different sizes of paper. The drawings were scored according to Buck's (1948) system and H-T-P IQs were obtained. The results failed to support the idea that the size of drawing paper has a significant influence on the quantitative aspects of the drawing. It does not appear as if the size of the drawing paper is a significant variable influencing the quality of drawings.

Cultural and Environmental Factors

Cultural and environmental influences are factors which should be considered in the evaluation of drawings. Though some have assumed that the H-T-P is relatively free of cultural or environmental influences, research does not support this. Nassario-Ortiz (cited in Bieliauskas, 1980) looked at the H-T-P drawings of Puerto Rican and American college students. All student were also given the California Test of Mental Maturity. The results of the study indicated that cultural and climatic differences in background may influence people's drawings. Significant differences were found in the drawings of the chimney, the leaves on the tree, and the number of stories in the house. Also a low but significant correlation was found between the

H-T-P IQ and the California Test of Mental Maturity IQ (Nazario-Ortiz, 1956). Koppitz and Casullo (1983) compared the person drawings of 147 American adolescents and 147 Argentinean adolescents. The samples were matched for age and socioeconomic status. The drawings were evaluated using Koppitz's (1968) developmental and emotional indicator scoring systems. The Argentinean teenagers were found to be better controlled, less aggressive, more concerned with appearance, and more evasive based on the evaluation of their drawings. The American students appeared to be more outgoing, impulsive, insecure, and aggressive based on their drawings.

Hammer (1953) compared the H-T-P drawings of Black and White children in terms of personality adjustment. Findings of the study suggest a greater incidence of emotional maladjustment in the group of black children. However, Hammer failed to adequately match the Black and White groups on such factors as socio-economic status and IQ. Gohman (cited in Bieliauskas, 1980) attempted to look at the same question as Hammer (1953). However in Gohman's study, he matched the Black and White groups in terms of socioeconomic status and IQ. The same adjustment scale was used as in Hammer's (1953) study, with seven categories from very well adjusted to psychotic. No significant difference was found in personality adjustment between the Black group and White group. Kuhlman and Bieliauskas (1976) administered the Otis

and the H-T-P to Black and to White high school students. No significant differences were found between Black and White subjects on the Otis or the H-T-P IQ scores. The results of these studies highlight the importance of considering factors such as IQ and socioeconomic status in research with the H-T-P. Actual IQ differences only appear when socioeconomic status is not matched.

Some research has been done looking at the effects of socioeconomic status on drawings. Goodenough and Harris (1963) found that children with higher IQs drew more realistic and complete figures. Pfeffer and Olowu (1986) have also conducted research concerning the effects of socioeconomic status on drawings. This study looked at the drawings of 125 Nigerian children from low income and from middle income families. The middle income children tended to draw figures which were more realistic and that had a more conventional shape. They were more likely to draw human figures that had all body parts and the parts were more likely to be in the proper position than in the drawings of children from low income families. Also, the middle income children more frequently drew clothed human figures than the low income children. All of these differences were statistically significant. However, before any conclusion can be drawn, it must be noted that Pfeffer and Olowu (1986) did not do anything to control for the factor of intelligence. Thus, it is uncertain if the

differences were due to the factor of socioeconomic status, to the factor of intelligence, or to some combination of the two. Further research is needed in this area.

Certain environmental factors may influence drawings and should be factors to possibly consider when interpreting drawings. Judson and MacCasland (1960) evaluated the drawings of 240 people. Results indicated that subjects drew more bare trees in winter than in summer. Moll (1962) investigated the question of season further. The H-T-P was given to 269 students at the beginning of fall and at the beginning of winter quarters. The results indicated that the season influences whether or not trees are drawn with leaves. Travis (cited in Bieliauskas, 1980) studied the effects of seasonal variation on the evaluation of the house, tree, and person drawings. Tree drawings were judged by psychologists to be significantly more maladjusted in spring. It appears that the season needs to be considered when interpreting drawings, especially with tree drawings.

However, besides season of the year, there are other environmental factors which may influence the final outcome of drawings. Cassel, Johnson, and Burns (1958) found that subjects drew drawings with more deviant signs, by Machover's scoring manual, when the examiner left the room during the drawing than when the examiner was present. The greatest differences appeared in the drawing of the tree. The authors, thus, concluded that the tree represents a

deeper level of personality integration than either the house drawing or the person drawing. Gender of the examiner is possibly another variable of interest, in its influence on the gender of the first figure drawn. It was found that gender has no effect on the performance of children (Datta & Drake, 1968) or on adults when the test is administered individually (Holtzman, 1952). Bauer and Paludi (1979) found that the examiner's gender did influence drawings that were given in a group format to undergraduate students. However, Jenson (1985) failed to replicate these results.

Reliability

Reliability is another important issue to focus on when looking at the value of assessment techniques involving drawings. Bieliauskas (1956) questioned the factor of scorer reliability since this is a factor that was often overlooked in early studies. In a review of 16 studies, Swenson (1968) came to the conclusion that the reliability of a sign on the Draw-A-Person was dependent on the amount of drawing behavior that was included in the sign. For example, global assessments of the quality of drawings, such as the cognitive and affective components of the drawings, were very consistent. This appears to be true for the inter-rater as well as test-retest reliability. Machover's (1949) idea was that structural and formal aspects of the Draw-A-Person, such as shading and placement, are drawn

consistently, and content details such as clothing are less consistent. Content, according to Machover, was reflective of the subject's current emotional state. However, aspects of drawings which reflect on a person's cognitive abilities are more likely to be stable.

Stumpfer (1963) scored drawings of psychotic patients for global variables such as overall drawing quality, maturity, sexual differentiation, adjustment, and body image disturbance. He obtained interrater reliability correlations ranging from .79 to .97. He also obtained test-retest correlation coefficients after one month ranging from .74 to .89 and that were all statistically significant at and beyond the .01 level on all factors. Guinan and Hurley (1965) also found encouraging evidence of test-retest reliability with college students. These students produced drawings at two different times five weeks apart. Judges were then asked to match drawings. The judges were from one of three groups: Ph.D.'s, graduate students, and college freshmen. The judges were able to match the drawings at a .001 level of significance, with the Ph.D.'s and graduate students making correct matches on an average of or better than 19 out of 20 matches and the college freshmen being correct with the matches on an average of 12 out of 20 matches.

Abell (1991) found encouraging results concerning reliability on both Buck's (1948) system and on the

Goodenough-Harris Drawing Test. With only a few hours of practice, the two raters in this study were able to achieve a high percent of inter-rater agreement for both of the scoring systems. For the Goodenough-Harris Drawing Test, the findings were consistent with previous research, with a kappa coefficient of .872 (Abell, 1991). Harris (1963) reported inter-rater correlation coefficients of .90 and above for the Goodenough-Harris system. Abell (1991) found a inter-rater reliability coefficient of .927 for Buck's (1948) system with the person drawings. Buck (1966) did not report inter-rater reliability figures for his system. However, the study conducted by Abell (1991) indicates that Buck's method is fairly easy to learn and can produce high inter-rater reliability.

Swenson (1968) found that global measures of drawings appear to be the most reliable, followed by structural and formal aspects, and then last with respect to reliability is the content. Since global ratings are the most reliable, Swenson (1968) saw these factors as the most useful in the rating of drawings. Roback (1968) proposed that the poor reliability on structural and content signs may be due to careless, idiosyncratic methods in the scoring of human figures.

In Kahill's (1984) review of the Draw-A-Person research, it is suggested that there be an increased focus on the training of raters and on making scoring systems more

objective so as to increase the reliability. Kahill (1984) reports, from reviews of studies from 1968 to 1982, that inter-rater reliability for both content and structural elements is equal to if not better than that of global factors.

Personality Assessment

As well as Buck (1948), several other individuals have studied the relationship between personality and drawings and have developed interpretive guidelines. Also, many studies have focused on the qualitative projective aspects of drawings. Singer (cited in Bieliauskas, 1980) studied the drawings of schizophrenics and compared them to those of college students. Drawings were scored according to qualitative criteria in Buck's (1948) manual. Drawings of the tree and person were found to be more useful in differentiating the college students from the schizophrenics than the house drawings. Behnen (cited in Bieliauskas, 1980) looked at the H-T-P drawings of chronic undifferentiated schizophrenics, paranoid schizophrenics, psychoneurotics, and normals using Koppitz's system of emotional indicators. Koppitz's system seemed to work in differentiating severely disturbed groups from mildly disturbed groups. However, the criteria were not effective for distinguishing disturbed from nondisturbed groups. The results of this study suggest that Koppitz's system may not be very useful with adults (Behnen, cited in Bieliauskas,

1980). Gravitz (1969) investigated depression using drawings. Two hundred adults were given the MMPI and the H-T-P test. It was predicted that normal females and males with high depression scores on the MMPI would tend to draw smaller figures than those low on the Depression scale. Statistical analyses failed to support these hypotheses.

Much of the available research has focused on the human figure drawings. Machover (1949) proposed that a person draws a human figure that represents the individual's view of himself or herself, thus revealing the individual's self-concept. Key elements of the personality are thought to be projected into their drawings, and psychological defenses are revealed. Hammer (1958) shares a similar view with Machover. He suggests a system of interpretations of human figure drawings with the idea that these drawings reveal elements of the person's self-concept. Sabataitis (cited in Bieliauskas, 1980) provided some empirical support for the notion of looking to drawings to evaluate self-concept. This study found that global ratings of the H-T-P drawings provided a better estimate of self-concept than rating on the Tennessee Self-Concept Scale. Hammer (1958) suggested that clinicians administer a whole battery of drawings, including Buck's (1948) House-Tree-Person drawings, Draw-A-Person in the Rain, and the Draw-A-Family.

Although many researchers continue to use the House-Tree-Person (H-T-P) technique that was developed by Buck

(1948), much of the research has focused on the person component. It would seem useful to conduct more research including the house and tree drawings, since they are often administered during evaluations and are considered by both Buck (1948) and Hammer (1958) to be useful. Hammer (1972) talks about the H-T-P as "a canvas upon which the subject paints aspects of his inner world, his personality strengths and weaknesses, including the extent to which he can mobilize his inner resources to handle psychodynamic conflicts." (p.1). Hammer (1972) sees the house, tree, and person drawings as each tapping different personality levels. The H-T-P technique supposedly has the capacity to assess body images on different personality levels. The Person drawing taps the individual's degree of adjustment on a psycho-social level, and the Tree drawing seems to assess more basic, enduring intrapsychic feelings and self-attitudes (Hammer, 1972). Hammer (1958) stated that the tree was "a symbol upon which to project subconscious information about the self" (p.172).

The drawing of the tree is thought, theoretically, to be less easily changed except by psychoanalytic therapy, whereas the Person drawing may show improvement with nonintensive types of therapy (Hammer, 1972). In addition, it seems as if it is easier for an individual to attribute more negative, emotionally disturbing traits to the Tree drawing since this is theorized to be less like a conscious

view of the self. Thus, Hammer (1972) proposes that deeper feelings are more easily projected onto the Tree with less fear of revealing the self. Oster and Gould (1987) proposed that it is easier for a person to attribute undesirable personality traits to an inanimate object because it appears to be more removed from self-description. Prognostically, it is believed to be more positive if the tree reveals a healthier picture of personality than the person. It would seem in this situation that the individual is currently overwhelmed by a reactive or situation-related emotional stress. A poorer prognosis is given when the tree reveals a much deeper degree of pathology than the person drawing. For example, deeper problems may be indicated if the tree is depicted as split, with a broken trunk or branches, with a scarred trunk, or is drawn as toppling over (Hammer, 1972).

According to Hammer (1972), The house drawings appear to fall somewhere in between the person and tree drawings in their capacity to tap personality levels. Prognostically, many view the tree and person drawings as most fruitful because they represent the extremes (Hammer, 1972). Thus there is little research that studies only House drawings. The house drawings seem to be viewed and interpreted more in conjunction with the tree and person drawings. However, there is some empirical research that focuses exclusively on the value of the Tree drawing as a projective diagnostic tool.

Buck (1948) and Hammer (1958) suggest that in tree drawings the trunk represents an individual's feeling of basic power and ego strength. Bolander (1977) disagreed and proposed that the trunk represents the person's internal relation with the emotional functions. Bolander (1977), Buck (1948), and Hammer (1958) all felt a scar, knothole, or broken branch indicated that the individual experienced a traumatic event. Buck (1948) hypothesized that the trunk's base was representative of infancy and that the top of the tree was the person's present age. Buck looked at the proportionality between the height of the tree and the age of the person when the tree is drawn with the measurement of the height of the trauma indicator to the age of the person at the time of the traumatic event. He thought these should correspond within one year on either side.

Several studies have examined the Tree Scar Trauma hypothesis. Levine and Galanter (1953) found that 7 out of 27 paraplegic veterans spontaneously drew trees with traumatic indicators. Lyons (1955) discovered a positive correlation between direct instructions to place a scar on the tree and the actual time of the worst event in the subject's life. Devore and Fryrear (1976) found that only 12 percent of randomly selected juvenile delinquents drew a hole or scar on the tree drawing. Torem, Gilbertson, and Light (1990) found a statistically significant relationship between previous victimization and whether or not scars,

knotholes, and/or broken branches were on drawn trees. Also, a significant relationship was found between the duration of physical abuse and the number of indicators on the tree (Torem, Gilbertson, and Light, 1990).

In summary, the H-T-P technique appears to provide an easy to administer, rapid, and useful device by which to obtain information about an individual's personality. In addition, according to Buck (1948) and Goodenough and Harris (1963), the human figure drawing is a useful tool in assessing cognitive abilities, and in the case of Buck's (1948) system, the house and tree drawings add to this assessment.

Cognitive Style

Some research has looked at cognitive style which focuses on intellectual functioning that also includes elements of personality. Studies have examined the relationship between the H-T-P and the measurement of cognitive style. Looking at cognitive style may provide the best predictor of cognitive functioning since it incorporates personality elements with cognitive ability. Toennis (cited in Bieliauskas, 1980) administered the H-T-P test to 98 Lithuanian and 98 American college students and scored them using Buck's (1948) system. There were significant differences between nationalities on each of the H-T-P IQ scores. The American group included more details and elaborations in the drawings of the house and person.

The Lithuanian group had better perspective and proportion in the tree drawings. The study led to questions concerning cultural differences which resulted in the postulation of differences in cognitive style (Toennis, cited in Bieliauskas, 1980). Yore (as cited in Bieliauskas, 1980) investigated the issue of cognitive style further by scoring these same drawings using the Articulation of Body Concept (ABC) which is a measure of the field dependent-independent cognitive style. The human figure drawings were scored using the ABC. Significant correlations were found indicating that the H-T-P could possibly be a valid measure of cognitive style. There were significant differences between the American and Lithuanian groups. Vincent (cited in Bieliauskas, 1980) also looked at the H-T-P as an instrument to measure cognitive style. Forty-six subjects were given the Embedded Figures Test and the H-T-P. Fifteen field dependent and fifteen field independent subjects were selected. The drawings were scored using Buck's (1948) system and IQs were obtained for each drawing. There was a statistically significant difference between the IQs of field independent and field dependent subjects. The field independent subjects obtained significantly higher IQs than the field dependent subjects.

Based on the above research, Bieliauskas (1980) has developed a scoring system to assess cognitive style using the H-T-P drawings. The scoring system involves determining

the level of cognitive style for each drawing and then calculating a unified score for the set of drawings. A Cognitive Style Quotient (CSQ) is determined. Bieliauskas (1980) proposed the CSQ as a valuable tool in the assessment of intellectual functioning and also of personality adjustment since cognitive style is part of total personality.

Abell (1991) tested the idea that the factor of field independence, as measured by the Picture Completion, Block Design, and Object Assembly subtests of the WAIS-R, would be a better predictor of cognitive scores on the Draw-A-Person test than Verbal IQ, Performance IQ, or Full Scale IQ. The results did not support this hypothesis because the subtest scores representing field independence did not serve as superior predictors of cognitive scores on the Draw-A-Person test.

Cognitive Assessment

Fabry and Bertinetti (1990) administered the Goodenough-Harris D-A-P Test to 31 children between the ages of 6 and 10 years. They also had WISC-R scores available for each child. Significant Pearson correlations were found between Verbal IQ and cognitive drawings scores ($r = .45$); between Performance IQ and drawing scores ($r = .69$); and between Full Scale IQ and drawing scores ($r = .62$).

Buck (1948) postulates that the "... H-T-P measures intellectual function in a situation deliberately designed

to activate non-intellective aspects of the personality which enhance or diminish efficiency of intellectual function" (p.3). Buck's system proposes to assess cognitive abilities by looking at the details, proportion, and perspective of each individual's house, tree, and person drawing. The technique was devised by using a sample of 140 adults from seven different intelligence ranks. There were 20 adults from each of the following levels of intelligence: imbecile, moron, borderline, dull average, average, above average, and superior. Subjects in the imbecile through average level were residents of Virginia, patients or employees of the Lynchburg State Colony. Subjects were placed in groups according to careful psychological examinations and observation. Subjects in the above average group were college students at the University of Nebraska and at the University of Virginia. Subjects in the superior group were graduate students at the University of Virginia Medical School. Attempts were made to screen out subjects with notable emotional and/or personality problems. The 140 sets of drawings were carefully analyzed to determine possible items that might differentiate subjects on the basis of intelligence. It was discovered that items of detail, proportion, and perspective seemed to best differentiate between the various intelligence groups. From this analysis, Buck derived a system which is based on both the presence and absence of an array of signs, instead of

topic in her relatively complete review of the literature on human figure drawings. However, Eyal and Lindgren (1977) did look at scores on the Basic Word Vocabulary Test and House-Tree-Person scores on Buck's (1948) system. These tests were given to 50 university undergraduates and 65 children in Grades 3 to 8. All three House-Tree-Person scores correlated positively and significantly with vocabulary test scores for female university students. The authors suggested that competence in graphic expression operates independently of verbal intelligence in males but not in females (Eyal & Lindgren, 1977).

Since the time of the Kahill (1984) review, Abell (1991) has looked at the relationship between the Person Component of Buck's (1948) system and IQ scores on Wechsler Intelligence Scale-Revised. He also investigated the Goodenough-Harris (1963) system's scores of the person drawings and their relationship to IQ scores on the WAIS-R. Abell found that cognitive scores on Buck's system were significantly correlated with both Performance and Full Scale IQ scores on the WAIS-R. In the case of Verbal IQ scores he found there was no significant correlation, but there was a trend for the raw scores and weighted scores to be correlated to the Verbal IQ. He also found Buck's standard scores to significantly underestimate both the Performance and Full Scale IQ scores. Abell found that cognitive scores on the Goodenough-Harris Test significantly

correlated with Performance and Full Scale IQ scores but not with Verbal IQ scores and that the scores on the Goodenough-Harris Test also significantly underestimated Verbal and Full Scale IQ scores. The correlations found between the Goodenough-Harris Test and IQs were not significantly different from the correlations found between Buck's scoring system and IQs. For both Buck's system and Goodenough-Harris' system, the correlation coefficients obtained with Performance IQ were significantly higher than the correlation coefficients obtained with Verbal IQ. There were trends for both systems' correlation coefficients with Performance IQ to be higher than the correlation coefficients obtained with Full Scale IQ.

It is notable that Abell (1991) found correlation coefficients between Buck's scores on the person component and WAIS-R IQs that were statistically significant yet lower than those reported by Buck (1966) in his revised manual on the H-T-P technique. It raises the question as to whether the House and Tree drawings add anything to Buck's (1948) cognitive scoring system. Abell only investigated the Human Figure Component of Buck's system and it may be that the additional information provided by the house and tree drawings is important in assessing cognitive abilities. It would be quite useful to determine what the house and tree drawings do contribute to the cognitive scoring system of Buck (1948). If the addition of these two drawings do in

fact increase the predictive accuracy of the system then it would be useful for clinicians to continue to administer them. This would also demonstrate an advantage of the H-T-P over other tests emphasizing only human figure drawings. If the house and tree drawings are not useful in this regard, it may make sense to reevaluate the utility of administering them, at least in terms of use for cognitive as opposed to personality assessment purposes. It is possible, but at this point not known, that, the tree and/or the house drawings may be more effective than human figure drawings as predictors of cognitive abilities and skills.

Given the lack of research on the topic of the value of drawings in the assessment of cognitive abilities, especially in regards to the tree and house drawings, it would be useful to further investigate this area. It would be particularly useful to look at this topic using the WAIS-R since there is no research on the cognitive evaluation of the H-T-P drawings and the WAIS-R, with the exception of Abell's (1991) study that looks at the person component only. Also, the study by Abell poses some interesting questions in regards to the underestimation of WAIS-R IQ scores by the cognitive scores on the person drawings in Buck's (1948) system. Since Buck's system includes a quite detailed system for cognitive scoring of both the house and tree drawings, it would make sense to investigate these components of his scoring system to determine if they

contribute to the validity and effectiveness of the system.

Hypotheses

1. It is predicted that scores yielded by Buck's scoring system on the House, Tree, Person, and Second Person, taken together, will be significantly related to Performance and Full Scale IQ scores and possibly Verbal IQ scores.
2. The scores on Buck's system of the Tree, House, Person, and Second Person will be significantly more related to Performance IQ than to Verbal or Full Scale IQ.
3. The prediction of the Verbal, Performance, and Full Scale IQ scores will be more accurate when using House, Tree, Person, and Second Person scores on Buck's system than when using just the cognitive score of the Person Drawing. In other words, there will be a more accurate estimation of IQ when using the scores of all four drawings than when just using the score of the Person Drawing.

CHAPTER II

METHODS

Subjects

The test protocols of 85 subjects were selected for the study from the archives of the Department of Psychology's assessment laboratory at Loyola University. The archives consist of psychological test protocols of undergraduates at Loyola University of Chicago who volunteered to take a standard battery of psychological tests. The undergraduate subjects received credit for their participation that partially fulfilled requirements of an introductory psychology class.

The protocols were administered by doctoral students in clinical psychology as part of their training in the administration of psychological tests. The students worked under the supervision of a clinical psychologist. All protocols were administered between the years of 1988 and 1990. Protocols were chosen that students had given later in their training after they had mastered the administration of the tests. Besides this stipulation, the subjects were randomly selected from several hundred available cases in the archives of the assessment laboratory.

Measures

The following measures were examined: 1) the House Drawing, 2) the Tree Drawing, 3) the First Human Figure Drawing of each subject, 4) the Second Human Figure Drawing of each subject, 5) the Wechsler Adult Intelligence Scale-Revised (WAIS-R) of each subject.

Procedure

The House, Tree, and Second Person Drawings were obtained from each of the archival protocols used by Abell (1991). The House and Tree drawings were unavailable in five of the archival protocols, thus these cases were omitted. The First Human Figure drawing of each protocol was scored by Abell (1991) according to the Person Component of Buck's (1948) House-Tree-Person Technique. The House, Tree, and Second Person drawings were scored using Buck's (1948) scoring system for the House, Tree, and Second Person respectively. The Verbal IQ, Performance IQ, and Full Scale IQ from the Wechsler Adult Intelligence Scale-Revised were also recorded for each subject.

CHAPTER III

RESULTS

After the drawings were scored, a raw score was determined for each drawing using Buck's (1948) system. Standard scores were also derived based on the raw scores. The raw scores and standard scores were found by Buck to be highly correlated ($r = .964$, $p < .0001$). Buck's standard scores are like IQ scores in that they were constructed to have a mean of 100 and a standard deviation of 15. Since our concern is with the use of the H-T-P as an IQ measure, the standard scores will be used for all the analyses. Mean scores and standard deviations were determined for the House, Tree, First Person, and Second Person standard scores as well as for WAIS-R IQ scores. The results are shown in Table 1.

Hypothesis #1

The first hypothesis predicted that the scores on Buck's (1948) system for the House, Tree, First Person, and Second Person would be significantly related to Performance and Full Scale IQ scores and possibly to Verbal IQ scores. To investigate this hypothesis, Pearson correlation coefficients were calculated for standard scores for the

Table 1.

Means and Standard Deviations for Drawing Scores and
WAIS-R Scores

Variable	Mean Score	Standard Deviation
Buck's (1948) standard score for House	102.12	23.48
Buck's (1948) standard score for Tree	98.42	19.99
Buck's (1948) standard score for Person One	99.67	17.97
Buck's (1948) standard score for Person Two	100.98	20.98
Buck's (1948) standard score for House, Tree, Person 1, & Person 2	98.61	13.70
<u>WAIS-R IQ Scores</u>		
Verbal IQ	109.98	12.18
Performance IQ	109.12	14.34
Full Scale IQ	110.88	12.40

House, Tree, Person One, and Person Two combined (HTP1P2) with Verbal, Performance, and Full Scale WAIS-R IQs. Also, correlations were reported for the standard scores using the First Person with Verbal, Performance, and Full Scale IQs. These will be used to evaluate later hypotheses. The correlation coefficients are reported in Table 2. These analyses indicate that cognitive scores on Buck's (1948) system for all the drawings combined were significantly correlated with both Performance and Full Scale IQ scores but were not significantly correlated with Verbal IQ scores. This supports the first hypothesis of the present study.

As found by Abell (1991), the standard scores on Buck's system for the first human figure drawing alone were also significantly correlated with Performances and Full Scale IQ scores. However the correlations using all the drawings were slightly larger. Analyses were performed to see if these differences between the correlations using the scores for all the drawings and the correlations using just the scores for the first person drawing were significant. The correlations were compared using t -tests, as recommended by Hostelling (1940) for testing the differences between two dependent correlation coefficients. The results are reported in Table 3. The correlations found between the HTP1P2 scores and Verbal, Performance, and Full Scale IQ were not significantly different from respective correlations between Person one scores and Verbal IQ,

Table 2.

Pearson Correlation Coefficients for All Subjects (n=85)
for Buck's (1948) Scoring System with Wechsler IQs

	Buck's (1948) Scoring System Standard Scores	
	Person 1	House-Tree-Person 1-Person 2
Verbal IQ	.150	.123
Performance IQ	.386**	.433**
Full Scale IQ	.307**	.315**

* $p < .05$

** $p < .01$

Table 3.

The t-test Values Obtained for the Differences in Pearson Correlation Coefficients for the HTP1P2 Scores and Verbal, Performance, and Full Scale IQ with Person 1 with Verbal, Performance, and Full Scale IQ

<u>Dependent Correlation</u>	<u>t</u>	<u>p</u>
Buck's standard score for HTP1P2 with Verbal IQ versus Buck's standard score for Person 1 with Verbal IQ	.342	NS
Buck's standard score for HTP1P2 with Performance IQ versus Buck's standard score for Person 1 with Performance IQ	.699	NS
Buck's standard score for HTP1P2 with Full Scale IQ versus Buck's standard score for Person 1 with Full Scale IQ	.133	NS

Performance IQ, and Full Scale IQ.

Hypothesis #2

The second hypothesis predicted that the scores on Buck's system based on the Tree, House, Person One, and Person Two would be more related to Performance IQ than to Verbal or Full Scale IQ. To test this hypothesis, the correlations between the House, Tree, Person 1, Person 2 (HTP1P2) scores with each the Verbal, Performance, and Full Scale IQ scores were used. The correlations were compared using the t -tests, as recommended by Hosteling (1940) for testing differences between two dependent correlation coefficients. The results of these analyses are reported in Table 4. The correlations found between the Buck standard score for the HTP1P2 and Performance IQ were significantly greater than the correlations between Buck's standard score for the HTP1P2 and Verbal IQ as well as for the correlation between Buck's standard score for HTP1P2 and Full Scale IQ. Also the correlation between Buck's standard score for the HTP1P2 and Verbal IQ was significantly different from the correlation between Buck's standard score for HTP1P2 and Full Scale IQ. These results support the hypothesis that the standard scores for the HTP1P2 are more related to Performance IQ than to Verbal or Full Scale IQ.

Hypothesis #3

The third hypothesis predicted that there would be a more accurate estimation of Verbal, Performance, and Full

Table 4.

The t-test Values Obtained for the Differences in Pearson Correlation Coefficients of the HTP1P2 Standard Scores with Verbal, Performance, and Full Scale IQ

<u>Dependent Correlation Coefficients</u>	<u>t</u>	<u>p</u>
Buck's standard		
Buck's standard score for HTP1P2 with Verbal IQ ($r=.123$) versus Buck's standard score for HTP1P2 with Performance IQ ($r=.433$)	3.813	<.001
Buck's standard score for HTP1P2 with Verbal IQ ($r=.123$) versus Buck's standard score for HTP1P2 with Full Scale IQ ($r=.315$)	3.004	< .01
Buck's standard score for HTP1P2 with Performance IQ ($r=.433$) versus Buck's standard score for HTP1P2 with Full Scale IQ ($r=.315$)	2.047	< .05

Scale IQ when using the scores on Buck's (1948) system for all four drawings (HTP1P2) than when just using the score based on the First Person Drawing. To investigate this, three multiple regression analyses were performed. The standard scores on Buck's (1948) system for the House, Tree, First Person, and Second Person were used as independent or predictor variables for each regression analysis. Verbal IQ, Performance IQ, and Full Scale IQ served as the criterion or dependent variables, with a separate regression analysis being performed for each.

The multiple regression analyses were done with SPSS-X Batch system of data analysis. A stepwise selection of independent variables was used. The stepwise procedure selects independent variables through a process of forward selection and backward elimination. In the forward selection, the F test was calculated for the hypothesis that the coefficient of the entered variable was 0. An independent variable was only put into the equation if the probability of the F statistic was less than the criterion value of .05. After each step in the selection, the variables in the equation were examined for elimination. With backwards elimination, the selected independent variables were removed unless the probability of the F value was less than .10. No variables were entered or removed in the regression analysis in which Verbal IQ on the WAIS-R served as the dependent variable. This indicates that none

of the standard scores on Buck's (1948) cognitive system significantly predict Verbal IQ. No conclusions could be drawn from the regression analyses in which Performance IQ and Full Scale IQ served as dependent variables. This is due to the high intercorrelation between predictor variables. In situations in which the predictor variables are highly correlated, only the first variable is going to be significant. There is a bias against the second predictor variable. The multiple regression analyses were heavily biased toward the first variable which was entered. DeWolfe, DeWolfe, Squires, and Slaymaker point out that this occurs because when the first variable is assessed, the variance that the first variable shares with each other predictor variable is removed from the remaining predictors. Also the other predictors lose all variance that is shared with the first variable that was used. All the variance the first variable had in common with the criterion is removed from the criterion variable as well. In sum, no conclusions could be drawn from the regression analyses involving Performance IQ scores and Full Scale IQ scores, and none of the standard scores on Buck's (1948) system seem to be useful in the prediction of Verbal IQ scores on the WAIS-R.

Next, it was necessary to assess if Buck's (1948) standard scores were an accurate reflection of WAIS-R IQ scores. This is important since there could be a strong

relationship between the two sets of scores yet the Buck standard scores could tend to overestimate or underestimate WAIS-R IQ scores. To investigate this issue, three Friedman Two Way ANOVAs were performed. Each analysis compared Buck's standard scores for Person One, Buck's standard score for all drawings (HTP1P2), and one of the WAIS-R IQ scores (Verbal, Performance, and Full Scale IQ). The Friedman analysis ranks the variables for each case, calculates the mean rank for each variable over all cases, and then calculates a test statistic with approximately a Chi-Square distribution. The results of the Friedman ANOVAs are in Tables 5 to 7. All three analyses indicated that the null hypothesis that all scores are equal should be rejected. Thus there appears to be some significant differences between the standard scores on Buck's system for Person One, the Buck standard score for HTP1P2, and Verbal IQ scores. There also was a significant difference between the standard score for Person One, the standard score for HTP1P2, and Performance IQ scores. In addition there was a significant difference between the standard score for Person One, the standard score for HTP1P2, and Full Scale IQ scores.

In order to pinpoint where these differences are, a Wilcoxon Matched Pairs Signed-Ranks Test was done for each combination of pairs of variables. To compute the Wilcoxon test, the differences between scores for each subject were ranked ignoring the signs. In the situation of ties,

Table 5.

Results of Friedman Two-Way ANOVA with Verbal IQ, Buck's Standard Score based on Person 1, and Buck's Standard Score based on HTP1P2

<u>Chi-Square</u>	<u>D.F.</u>	<u>p<</u>
27.69	2	.00005

Table 6.

Results of Friedman Two-Way ANOVA with Performance IQ, Buck's Standard Score based on Person 1, and Buck's Standard Score based on HTP1P2

<u>Chi-Square</u>	<u>D.F.</u>	<u>p<</u>
36.21	2	.00005

Table 7.

Results of Friedman Two-Way ANOVA with Full Scale IQ, Buck's Standard Score based on Person 1, and Buck's Standard Score based on HTP1P2

<u>Chi-Square</u>	<u>D.F.</u>	<u>p<</u>
38.69	2	.00005

average ranks are assigned. The sums for positive and negative differences were then calculated. The results of the Wilcoxon tests are in Table 8.

From the Wilcoxon tests, it looks as if both the standard scores for the First Person Drawing and the standard scores based on all the drawings are significantly different from Verbal IQ, Performance IQ, and Full Scale IQ scores. It appears that the standard scores on Buck's (1948) system, based both on Person One and HTP1P2, underestimate WAIS-R IQ scores. The Wilcoxon test that compared scores for the Person One drawings and scores using all drawings (HTP1P2) indicated that there is no significant difference between these scores. The use of all the drawings to obtain the standard score on Buck's system does not appear to result in any greater accuracy in estimation of WAIS-R IQs than use of solely the first person drawing. In sum the standard scores on Buck's (1948) system do not seem to precisely estimate WAIS-R IQ scores. These scores on Buck's system appear to underestimate WAIS-R IQs.

Table 8.

Results of Wilcoxon Matched-Pairs Signed Ranks Tests

<u>Pair</u>	<u>Z</u>	<u>p</u>
Verbal IQ with HTP1P2 standard score	-5.17	.00005
Verbal IQ with Person 1 standard score	-4.75	.00005
Performance IQ with HTP1P2 standard score	-5.38	.00005
Performance IQ with Person 1 standard score	-4.74	.00005
Full Scale IQ with HTP1P2 standard score	-5.97	.00005
Full Scale IQ with Person 1 standard score	-5.30	.00005
Person 1 standard score with HTP1P2 standard score	-0.99	.32 (NS)

CHAPTER IV

DISCUSSION

This study attempted to answer some questions regarding intellectual evaluation based on the house, tree, human figure one, and human figure two drawings of the H-T-P by looking at the relationship between Buck's (1948) system and the Wechsler Adult Intelligence Scale Revised (WAIS-R). Abell (1991) found some compelling findings in his study that indicated that the standard scores for the First Person Drawings on Buck's system significantly correlated with Performance and Full Scale IQ. However these scores tended to underestimate the WAIS-R IQ scores. Thus the present study proposed that scores on Buck's system would provide an accurate estimate of WAIS-R IQ scores, and that the scores based on all the drawings, as Buck advocates, would be better predictors of WAIS-R IQ scores than those based solely on the person drawing.

The present study does provide partial support for the hypothesis that scores, based on all drawings, on Buck's system would be significantly and positively correlated with Performance and Full Scale IQ scores, and possibly Verbal IQ scores. The results show significant correlations between

Buck scores based on the HTP1P2 and Performance and Full Scale IQ scores but not with Verbal IQ scores. Next one may wonder if the addition of the House, Tree, and Second Person Drawings did anything to increase the relationship between Buck's standard scores and WAIS-R IQ scores. Though the correlations between Buck's scores and WAIS-R IQ scores is slightly larger when the scores are based on all the drawings, these correlations did not prove to be significantly greater. Thus the addition of the House, Tree, and Second Person Drawings does not appear to significantly strengthen the relationship with WAIS-R IQ scores. The hypothesis that the prediction of WAIS-R IQ scores would be more accurate when using the scores of all four drawings than when just using the score of the first person drawing was not supported. The use of the house, tree, and person two drawings does not seem to significantly enhance the validity of Buck's system of cognitive assessment. The results of the present study do not support Buck's idea of using and scoring the House, Tree, and Person Drawings in his system of assessing cognitive ability. It appears, at least with this population, to be unnecessary to administer and score all the drawings. The scores based on just the Human Figure Drawing are as valid in estimating and predicting Performance and Full Scale IQ scores as use of all the drawings. If this turns out to be supported in further research, the use of the score of the Human Figure

Drawing on Buck's system could be a potentially time efficient and economical way to obtain a rough estimate of cognitive abilities.

One must be cautious in the interpretation of the correlation coefficients found between Buck's score for the HTP1P2 with Performance IQ and Full Scale IQ. The statistically significant correlations that were found only account for a small percent of the variance due to the relatively large number of subjects. Also, one cannot assume that because the scores are significantly correlated clinicians can accurately predict one score from the other, for example Performance IQ from Buck's score for HTP1P2.

In actuality, when this issue was investigated further, it was discovered that Buck's standard scores, based on the HTP1P2 drawings, significantly underestimate WAIS-R IQ scores. This is similar to what Abell (1991) found in his study looking at Buck's scores for the Human Figure Drawing and WAIS-R IQ scores. He also found that Buck's scores significantly underestimated WAIS-R IQ scores. When the present study compared Buck's standard scores using the HTP1P2 with the scores based only on the First Human Figure Drawing, no significant difference was found. It appears, at least with this population, that the use of additional drawings in determining Buck's standard scores did not improve the ability to accurately predict WAIS-R IQ scores. Therefore clinicians should exercise caution in interpreting

scores on Buck's system. Further research is needed to develop more knowledge about and perhaps refine Buck's scoring system. Based on the present study, it would appear that it is unnecessary to use all of the drawings to determine a score on Buck's system, since the system seems to be just as effective for the purpose of cognitive evaluation with use of solely the Human Figure Drawing. This could be good news for clinicians, in that the use of only one drawing could conserve a great deal in terms of time, energy, and resources. Of course caution should be exercised, until further research is done to either support or refute these conclusions.

Both the regression analysis and correlations of the present study indicate that the scores on Buck's system do not relate to or predict Verbal IQ. Buck's scores on his system based on all the drawings was significantly more correlated to Performance IQ than with Verbal IQ scores. Also the relationship between Buck's scores and Performance IQ scores was significantly higher than relationships between Buck's scores and Full Scale IQ. Abell (1991) discovered a similar pattern when he looked at Buck's scores based on solely the Human Figure Drawing. In addition, the present study's regression analysis indicated that none of Buck's scores for any of the drawings was selected as a significant predictor variable for Verbal IQ. More research is needed to determine if Buck's (1948) system has any

significant validity in the assessment of Verbal IQ or if it is mostly a measure of Performance IQ. Buck (1966) claims that his system is effective in estimating Verbal, Performance, and Full Scale IQ scores. However both the results of the present study and those of Abell's (1991) study suggest that Buck's system is more a measure of nonverbal cognitive ability.

It is worthwhile to note that although the correlation coefficients for Buck's (1948) scores based on all the drawings were statistically significant, they were lower than the correlations that Buck (1966) reported in his book about the H-T-P technique. Abell (1991), in his study using the Human Figure Drawings, also reported lower correlations than those reported by Buck. Use of all drawings (House, Tree, Person 1, Person 2) did not significantly increase the correlations reported by Abell (1991). So at least with this population of undergraduate college students, the addition of drawings does not increase the correlations and bring them closer to the figures that Buck (1966) reports. In his book, Buck (1966) set forth Pearson correlations based on a study of 100 Caucasian adults at a home for the mentally retarded. The following correlation coefficients for the HTP technique with the Wechsler-Bellevue Intelligence Scale were reported: for HTP and Verbal IQ, $r = .699$; for HTP and Performance IQ, $r = .724$; and for the HTP and Full Scale IQ, $r = .746$. There are many possible reasons

that could account for these higher correlation coefficients. This system could work more effectively in assessing those in the lower range of IQ scores, such as the mentally retarded individuals who Buck (1966) tested. Buck's (1966) system may not be as effective with individuals in the average to superior range of intelligence, or it could be that subjects in the present study likely constitute a restricted range of IQ scores. This restricted range could lower the correlations. Another possibility is that Buck's system had a greater relationship with the Wechsler-Bellevue Scale than to the current WAIS-R. It would be beneficial for future research to investigate some of these questions.

Suggestions for Future Research

The current study brings up a number of questions for further research. Several of these will be discussed in the following paragraphs.

As mentioned earlier, past research (Buck, 1966) has shown higher correlation coefficients between HTP scores and individual IQ tests than the present study has found. Buck may have obtained such results because of his use of mentally retarded subjects as opposed to undergraduate students. It may be that Buck's system does better in testing those with lower than average IQ scores, or when a greater range of IQ scores is present. It would be useful to conduct a study that included individuals with a wide

range of IQs. Also it would be a good idea to include a larger range of subjects in terms of age; the present study included individuals between 18 and 24 years of age. The scoring system may function differently for various age groups. It would be helpful as well to conduct further research using children to see if Buck's system is possibly valid as a tool of cognitive assessment with a young population. Research with various different populations could also inform about whether Buck's system consistently underestimates IQ scores on individual IQ tests, such as the WAIS-R.

If further research indicates significant relationships between Buck's standard scores with Performance and Full Scale IQ yet an underestimation of these IQ scores, it might be helpful to derive an equation to use with Buck's (1948) standard scores in order to correct for this underestimation. Possibly, a correction figure could be used which would be derived by obtaining the difference between the standard score on Buck's system and the WAIS-R IQ scores. The difference in the means could be added to each individual's HTP1P2 standard score. A different correction figure could be determined for each category or range of IQ scores. This could make Buck's (1948) system more accurate and increase its usefulness to clinicians attempting to estimate cognitive abilities, at least in terms of nonverbal abilities.

It might be worthwhile to conduct future research which would look at how many subject's IQ scores on Buck's system and on the WAIS-R result in subject's classification in the same category and how many result in classification in different IQ categories. Also it would be interesting to investigate how useful a weighted score, correction figure or correction equation would be in improving the number of subjects who would be classified in the same category of IQ.

If Buck's (1948) system is primarily a measure of nonverbal ability, then it could be useful to conduct future research in order to determine if Buck's scores correlate with subtests on the WAIS-R and/or the WISC-R that are commonly used to assess educationally deprived children and adults. Usually, educationally deprived individuals do poorly on certain subtests, many of them verbal subtests, which are dependent on formal educational learning, and thus this effects their IQ scores on standardized tests. Buck's system could prove useful in assessing the cognitive abilities of such educationally deprived individuals.

Overall, the significant correlations derived in the present study indicate that Buck's (1948) scoring system has merit. It, therefore, would seem useful to further refine the system to make it a more accurate predictor of standard IQ scores. Perhaps an item analysis of the scoring system would elucidate the scoring items for each drawing which add the most to the accuracy of prediction of the system. This

could result in a more predictively accurate and streamlined scoring system. Alternatively, it may be possible to develop a weighting system to enhance accuracy in the IQ scores.

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